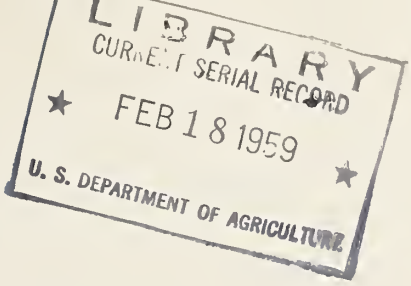

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MECHANICAL SEED CUTTING AND HANDLING OF POTATOES

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MECHANICAL SEED CUTTING AND HANDLING OF POTATOES

By

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INTRODUCTION

Seed cutting of potatoes by hand is a seasonal operation which requires a large amount of labor for a period of short duration. Since in a potato growing area most growers begin operations at about the same time, there may be an acute shortage of labor for hand cutting the seed tubers. Also, a desire to reduce the dependence on extra labor is perhaps an anticipation of savings in direct cutting costs. Compared to land rent, cost of seed, and cost of harvesting, the actual cost of cutting the seed tubers is not a large item. Delays in potato planting, perhaps the result of an inadequate supply of workers for hand cutting, however, may result in indirect losses through less efficient use of field labor and field machinery.

Objectives. This report is based on studies undertaken to obtain information on potato seed cutting and handling in order to reduce (1) personnel requirements and (2) costs. A parallel objective was the improvement of quality of seed as related to cutting and handling methods.

Procedure. The study consisted of two parts, as follows:

1. Observation and analysis of seed cutting and handling methods currently in use in the Red River potato-growing area.

2. A laboratory study to evaluate the effects of seed cutting techniques on the quality of the seed pieces produced.

In this report references to seed handling include all handling of whole tubers and cut pieces incidental to cutting, treating, transporting to the field, and filling planter hoppers.

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MECHANICAL SEED CUTTERS

Several makes and models of commercially manufactured seed cutters are available. These machines can be classified, as follows:

I. Automatic seed cutters
   A. "B" splitters
   B. Multiple sizer-cutters

II. Nonautomatic seed cutters (hand-fed)
   A. Number of cuts selected by operator through placement of tubers in appropriate cup.
   B. Number of pieces cut determined by machine.

The automatic seed cutters are machines that feed the tubers into the cutting mechanism without any assistance by the operator. There are several makes of the "B" splitters, and all are simple in design. By U. S. Grade Standards, tubers more than 1-1/2 inches in diameter and those less than 2-1/4 inches are designated as "B" size. The "B" splitters make only two seed pieces from each tuber. The multiple sizer-cutters are more complex as the machines cut seed potatoes into 2, 3, or 4 pieces, depending on the size of the tuber.

The nonautomatic machines are those in which the individual tubers are positioned in the seed cutters by hand. In the one type, the operator's placement of the tuber in the appropriate cup determines the number of pieces into which a tuber is cut. In the other type, the operator positions the individual tubers by hand, but the machine automatically selects the number of pieces into which the tuber will be cut. This automatic selection is based on the length of the tuber.

QUALITY RELATED TO NUMBER OF SEED PIECES CUT MECHANICALLY

Cut seed samples from a number of mechanical cutters were collected and evaluated in respect to (1) uniformity of seed piece size and (2) incidence of seed pieces without eyes. Using these criteria, the mechanically cut seed was generally found to be approximately equal to that of hand-cut seed produced by people working under usual supervision.

Tests conducted with tubers selected by weight to be cut into seed pieces approximately 1-1/2 ounces in size indicate that when seed tubers are cut into more than 6 pieces, an excessive proportion of seed pieces without eyes are produced. This is equally true of hand-cut seed and mechanically cut seed where the hand cutters pay little attention to the positions of the eyes relative to making the cuts.

The shape of the seed piece produced by a mechanical seed cutter is a factor to consider in selecting a mechanical seed cutter. A blocky seed piece is usually desired. An automatic cutter that is satisfactory for round varieties of potatoes will produce seed pieces that may be considered excessively long when used to cut long varieties of potatoes. Consequently the choice of a seed cutter will depend somewhat on the variety of the potato to be cut.

Most of the seed cutters currently manufactured will cut tubers into a maximum of 4 seed pieces. The automatic cutters now available cannot be used to make more than 4 seed pieces per tuber. The nonautomatic cutters of the type requiring the operator to determine the number of seed pieces into which a tuber is to be cut can cut 6 or 8 seed pieces. The large tubers are split in halves with a hand knife and the two halves placed in the cutter to be cut into either 3 or 4 pieces each. One make of nonautomatic seed cutter will cut potatoes into 6 pieces without preliminary splitting by hand.

COST OF MECHANICAL SEED CUTTING

The extent of the reduction in seed cutting costs which may be accomplished by the use of mechanical seed cutters as compared to hand cutting depends on (1) the amount of seed cut annually, (2) the ratio of the seed potatoes that are cut by the mechanical cutter to the oversize, which must be cut by hand, (3) wage rates for hand cutting, and (4) the costs chargeable to the use of the cutter.

Commercial mechanical cutters vary in respect to initial cost, cutting capacity, and labor required for operation. If field-run seed potatoes are machine-cut and the oversize tubers are cut by hand, the cost per bushel of using the cutter should apply only to the proportion of the tubers actually cut by the mechanical cutter. It is assumed that the labor cost of hand cutting the oversize tubers is the same per bushel as that for hand cutting the field-run potatoes. In estimating the annual repair costs on a seed-quantity basis, it is logical to include the oversize potatoes when a multiple sizer-cutter is used with unsized bin-run potatoes. This is based on the fact that the machine is running continuously and the rejection of oversize tubers by the machine does not decrease wear on the machine. In fact, an excess of oversize tubers in the seed lot may increase machine wear, as a fast rate of cutting oversize tubers by hand may extend the duration of machine use.

The machine costs include fixed annual charges for depreciation and interest regardless of use. The estimated annual cost of repairs is based on maximum of $5.00 per $100 of machine cost when the machine is used on 4,800 cwt. annually. This amounts to 0.10416 cent per cwt. Since the repair cost can be expected to be proportional to the use, this figure

is multiplied by the total number of hundredweight run through the machine to compute the annual repair cost when the total amount of seed cut is more or less than 4,800 cwt.

Machine cost, as discussed above, can be computed on the basis of cost per 100 cwt. of seed actually cut mechanically by the four following equations.[2/]

(1) Depreciation ($ per 100 cwt.) = $\frac{1000\ P}{Q\ (100 - \%\ O.S.)}$

(2) Interest ($ per 100 cwt.) = $\frac{300\ P}{Q\ (100 - \%\ O.S.)}$

(3) Repairs ($ per 100 cwt.) = $\frac{.10416}{100 - \%\ O.S.}$

(4) Total Cost ($ per 100 cwt.) = $\frac{P}{100 - \%\ O.S.}\ (\frac{1300}{Q} + .10416)$

Figure 1 is a line chart based on equation (4). This figure illustrates the relationship of mechanical seed cutter costs to the quantity of seed cut annually and the percentage of oversize tubers in the seed lots. The oversize tubers are those of a size too large to be cut by the mechanical cutter, without any preliminary hand cutting, into the correct number of pieces to produce seed pieces of approximately the desired average size. The unit-machine cost is based on the actual amount of seed cut by the mechanical cutter. For a given total quantity of seed cut the amount mechanically cut is inversely proportional to the oversize percentage.

Table 1 shows the same relationship on the "total" lines for the same oversize percentages and selected values for total quantity of seed used annually. In addition, Table 1 shows the distribution of total cost between the fixed charges (depreciation and interest) and repairs.

The prices of "B" splitters range from approximately $150 to $350. Most "B" splitters are simple in design and many of them are custom made in local machine shops. The machines for cutting tubers of varying sizes into suitable numbers of seed pieces are more complex and consequently cost more. They range in price from $475 to approximately $1,100.

[2/] P = Price ($) of machine.
Q = Total amount (cwt.) of seed cut annually.
% O. S. = Percentage (by weight) of oversize tubers.

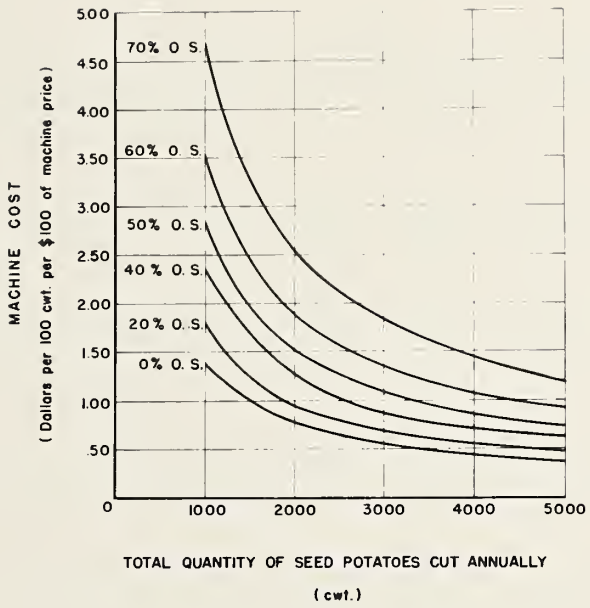


Figure 1. Relationship of mechanical seed cutter costs to the quantity of seed cut annually and the percentage of oversize tubers in the seed lots.

PRESIZED SEED POTATOES IN RELATION TO STAND AND QUANTITY OF SEED REQUIRED

Seed cutting tests with Red Pontiac potatoes indicated that when seed tubers are cut into 8 pieces as much as 25 percent of the seed pieces will be devoid of eyes. Tubers cut into 6 pieces will produce seed pieces of which about 5 percent will be devoid of eyes. When tubers are cut into not more than 4 pieces, practically all of the pieces will have one or more good eyes. In bin-run seed potatoes, which include a high proportion of large tubers cut into 8 pieces, the seed thus produced will have an excessive number of pieces without eyes. Table 2 illustrates this relationship.

The average seed piece size desired is to some extent a matter of choice by the grower. It appears, however, that an average seed piece weight of 1-1/2 ounces is the size most widely preferred by growers in the Red River Valley. If seed tubers weighing from 2 to 13 ounces are cut as shown in Table 3, the average seed piece weight will be approximately 1-1/2 ounces. The relationship of seed piece weight to the amount of seed required per acre with 38-inch row spacing and 10-inch seed piece spacing in the row is illustrated graphically in Figure 2.

TABLE 1. Relationship of Annual Machine Cost Per 100 Cwt. Potatoes Cut Annually Per $100 of Mechanical Cutter Price According to Oversize-Tuber Distribution.

O.S. (%)	Depreciation* (D) Interest (I) Repairs (R)	Annual machine cost ($) by indicated quantity (cwt.) of seed potatoes cut									
		500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000
70	D + I	$8.680	$4.335	$2.890	$2.167	$1.734	$1.445	$1.239	$1.083	$0.963	$0.868
	R	.347	.347	.347	.347	.347	.347	.347	.347	.347	.347
	Total	9.027	4.682	3.237	2.514	2.081	1.792	1.586	1.430	1.310	1.215
60	D + I	6.500	3.250	2.165	1.625	1.300	1.083	.930	.814	.723	.650
	R	.260	.260	.260	.260	.260	.260	.260	.260	.260	.260
	Total	6.760	3.510	2.425	1.885	1.560	1.343	1.190	1.074	.983	.910
50	D + I	5.210	2.600	1.734	1.300	1.040	.868	.744	.651	.579	.521
	R	.208	.208	.208	.208	.208	.208	.208	.208	.208	.208
	Total	5.418	2.808	1.942	1.508	1.248	1.076	.952	.859	.787	.729
40	D + I	4.340	2.172	1.446	1.086	.868	.724	.620	.542	.482	.434
	R	.174	.174	.174	.174	.174	.174	.174	.174	.174	.174
	Total	4.514	2.346	1.620	1.260	1.042	.898	.794	.716	.656	.608
20	D + I	3.250	1.625	1.081	.813	.650	.542	.464	.406	.361	.325
	R	.130	.130	.130	.130	.130	.130	.130	.130	.130	.130
	Total	3.380	1.755	1.211	.943	.780	.672	.594	.536	.491	.455
0	D + I	2.600	1.300	.867	.650	.520	.434	.372	.325	.289	.260
	R	.104	.104	.104	.104	.104	.104	.104	.104	.104	.104
	Total	2.704	1.404	.971	.754	.624	.538	.476	.429	.393	.364

* The depreciation (D) is calculated at 10% per year. Interest (I) is computed at 6% on one-half of the cost. The total repair cost is calculated at $0.104 per 100 cwt. fed to the mechanical cutter. The cost per 100 cwt. is based on the tubers actually cut by the mechanical cutter. % O.S. is the percentage of tubers by weight which are too large to be cut into the correct number of seed pieces of the desired size without preliminary hand cutting. Example: 3,000 cwt. of seed cut in 1 year. 40% oversize tubers. Price of cutter $900. Table shows machine cost of $0.898 per 100 cwt. per $100 of machine price. Cost for use of $900 machine is 9 x .898 or $8.08 per 100 cwt., approximately 8¢ per cwt. Since 40% are oversize, the machine actually cuts only 60% of 3,000 cwt., or 1,800 cwt. The unit cost is based on the 1,800 cwt. only.

TABLE 2. Percent of 1-1/2 oz. seed pieces without eyes as related to number of seed pieces per tuber of Red Pontiac potatoes.*

Pct. by weight cut into 6 seed pieces	Pct. by weight cut into 8 seed pieces										
	0	10	20	30	40	50	60	70	80	90	100
100	5.0										
90	4.5	7.0									
80	4.0	6.5	9.0								
70	3.5	6.0	8.5	11.0							
60	3.0	5.5	8.0	10.5	13.0						
50	2.5	5.0	7.5	10.0	12.5	15.0					
40	2.0	4.5	7.0	9.5	12.0	14.5	17.0				
30	1.5	4.0	6.5	9.0	11.5	14.0	16.5	19.0			
20	1.0	3.5	6.0	8.5	11.0	13.5	16.0	18.5	21.0		
10	0.5	3.0	5.5	8.0	10.5	13.0	15.5	18.0	20.5	23.0	
0	0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0

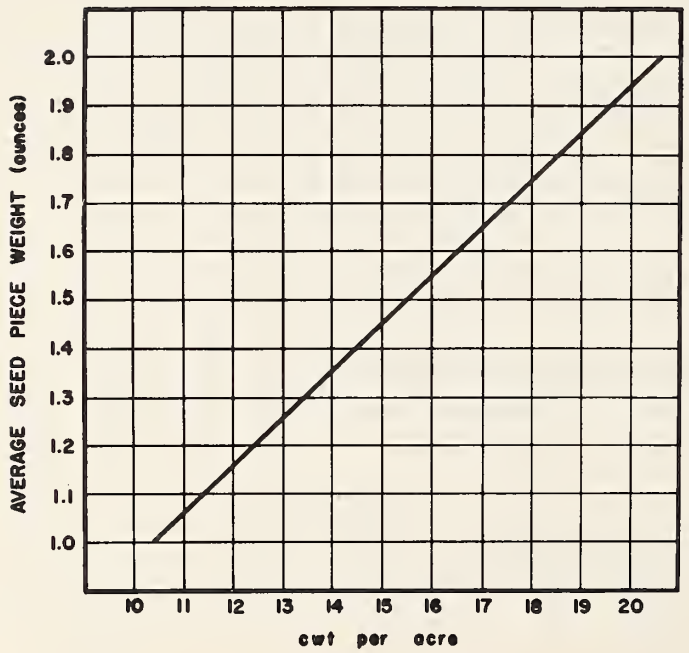
* The following example illustrates the use of this table. It is desired to produce 1-1/2 ounce seed pieces from seed potatoes with the following size distribution (by weight):

Percent	Tuber size range (oz.)	Seed Pieces per tuber
50	2 to 7	2, 3, or 4
30	7 to 11	6
20	11 to 13	8

From the table it is found that 6.5% of the total seed pieces will be devoid of eyes.

TABLE 3. Dimensions by tuber size to produce seed pieces averaging 1-1/4, 1-1/2, and 1-3/4 ounces.

Minimum or maximum	Tuber size range (oz.) to produce (per tuber) seed pieces numbering--				
	2	3	4	6	8
FOR 1-1/4 OUNCE AVERAGE SEED PIECE					
Minimum	2	3	4½	5½	9½
Maximum	3	4½	5½	9½	11½
FOR 1-1/2 OUNCE AVERAGE SEED PIECE					
Minimum	2	4	5	7	11
Maximum	4	5	7	11	13
FOR 1-3/4 OUNCE AVERAGE SEED PIECE					
Minimum	2½	4	6½	7½	13½
Maximum	4	6½	7½	13½	14½



$$\text{Cwt. per acre} = \frac{3920\ W}{S \times D}$$

Where W = Average seed piece weight (ounces),

S = Row spacing (inches),

D = Seed piece spacing in the row (inches).

Figure 2. Relationship of seed piece weight to the amount of seed required per acre.

HANDLING OF CUT POTATO SEED

The seed cutting, whether by hand or with a mechanical cutter, is invariably (to our knowledge) done at the storage. The cut seed may be transported to the field in bags on a flat-bed truck or in bulk in a self-unloading truck box of the type used in receiving potatoes from a mechanical harvester. This discussion is intended to emphasize methods rather than details of equipment and operation.

The merits of bulk handling versus bag handling of cut seed should be considered in conjunction with a number of other factors involved in the seed handling operations. These factors include:

1. Amount of seed planted annually.

2. Equipment available (including power source for operating handling equipment in the field) for quickly refilling planter boxes.

3. Chemical treatment of seed--in the warehouse or in the field.

4. Type of labor available (bulk handling can eliminate arduous labor of handling bags of seed in the field).

The handling of seed in bulk self-unloading boxes requires some power source for driving the conveyor in unloading the harvested potatoes and for driving the transfer conveyor used to place the cut seed in the planter hopper or in a treating tank if the seed is treated in the field.

The self-unloading boxes after use in harvesting operations are unloaded at the warehouse, where suitable electric service is generally available for driving the unloading conveyor. In the field a different power source usually must be provided. Some power sources used for operating seed handling equipment in the field are listed below:

1. Small portable gasoline engine.

2. Engine of seed hauling truck through p.t.o. on transmission.

3. 110-volt or 220-volt generator mounted on the tractor used for pulling the planter.

4. 6-volt or 12-volt battery and an auto or truck engine starting motor.

All of these power sources have been used successfully for operating bulk seed handling equipment in the field. It is, of course, necessary to design the drive system to suit the power unit and provide the correct speed for the conveyors to be driven. A direct-current starting motor

can provide ample power for short periods of intermittent operation, but this will overheat if used continuously until a full truck box is unloaded.

If the seed is transferred directly (no field seed treatment) from the bulk box to the planter hopper, the conveyors should have a high capacity so a minimum of time will be required for refilling the seed hoppers on the planter. Another requirement is portability and ease of regulating the position of the transfer conveyor relative to the planter hopper. From the standpoint of this latter consideration, it is preferable to have the transfer conveyor designed to deliver the seed from the side of the truck rather than straight back. With this arrangement the truck can be driven forward or backward as necessary to distribute the seed evenly in the planter seed hopper.

Bulk seed handling reduces the labor at the storage from that required in the handling of cut seed in bags, inasmuch as the job required for filling and loading the bags onto a truck can be eliminated. The saving of labor in the field by bulk handling is not so apparent, but the strenuous work of handling the seed-filled bags is eliminated. If the seed is treated at the warehouse, bulk handling eliminates the disagreeable job of handling bags saturated with the treating solution.

Seed Treating. The benefits of seed treating are not firmly established. In fact, some of the research conducted on seed treating indicates that it is of little value. However, since the treating of cut seed is a widespread practice in many areas, some of the methods and equipment are described.

Chemical seed treatment may be applied at the warehouse or in the field. If the seed is treated at the warehouse using a continuous treating tank, the treating operation requires no additional labor; whereas field treating requires an additional man in the field to keep one 2-row planter supplied with seed. It may be possible, with an efficient field seed handling system, for one man to treat seed for two planters; but in the operations studied, two men were required to handle the seed treating where two planters were used.

Field treatment of cut potato seed requires more labor than treating the seed at the warehouse. However, there are two advantages in performing this operation in the field which some operators may feel are worth more than the additional labor required.

One advantage when the seed is treated in the field is that only enough seed for one planter refill is treated at one time. If planting is interrupted by rain, only a few bushels of treated seed will be on hand, whereas a truck load of treated seed may be left unplanted when the seed is treated at the warehouse.

Another advantage of field treating in respect to handling is the rapidity with which the planter hoppers can be refilled. The cut seed is placed in a crate which is then immersed in a tank partly filled with treating solution. The crate is equipped with a door in the bottom so that the seed can be quickly dropped into the planter hopper. Operators using this system were found to lose a minimum of planting time in refilling the planter hoppers with seed.

Two systems, with various modifications, are used in handling the crates after they are filled with seed. In one system the crates are lowered, raised, and moved into position for filling the planter hoppers by semistationary hoisting equipment, which may be power driven or hand operated. The treating and handling equipment is located at one end of the field (or in the middle if the rows are much longer than 1/2 mile), and the planter is taken to the treating and handling station for refilling. In the other system the treating tank is semistationary, and the crate of treated seed is carried to the planter with a tractor equipped with a front-end loader or other suitable hoisting equipment. From the standpoint of time required for refilling the planter with seed and for personnel requirements, there are no marked differences in the merits of the two systems. Perhaps the most important factor in the selection of one system over the other would be the kind of equipment most readily available.

Figures 3 to 7 illustrate some of the different seed handling methods. Figure 3 shows a gasoline driven transfer conveyor. This unit is mounted on two pneumatic tired wheels. It is attached to the trailer hitch of the truck and can be quickly detached when the self-unloading box is emptied. The unloading conveyor in hopper box on the truck is driven by the truck engine. This system of filling the planter hoppers has the merit of mobility as the unit can be readily moved for distributing the cut seed as the hoppers are filled. About 5 minutes were required to fill the hoppers of a two-row planter. The capacity of the unloading conveyor in the truck hopper box was the limiting element in this case. The cut seed was planted without any chemical treatment.

Figures 4a and 4b, 5a, 5b, and 5c, and 6a and 6b illustrate methods of handling and treating seed in the field. In figures 4a and 4b, the cut seed is transported to the field in bags and the seed pieces are emptied out of the bags into wooden baskets which are placed in the treating tank for a few minutes, then set out to drain (A). The contents of the baskets are emptied into the planter hoppers by hand (B). The equipment cost is low for this method of seed treating and one man is able to treat the seed as fast as it is planted. However, considerably more time is required to fill the planter hoppers than is the case where the seed is handled mechanically.

5a, 5b, and 5c illustrate a method of treating seed in the field, including a complete mechanical handling system. The self-unloading

truck box is filled at the warehouse where the seed is cut. The self-unloading conveyor and the transfer conveyor are used to fill the crates (A) in which the seed is treated. Hydraulically operated booms are used to handle the crates (B and C). Doors in the bottom of the crates permit rapid filling of the planter seed hoppers.

Figure 3. Gasoline engine driven transfer conveyor.

In figures 6a and 6b the cut seed was transported to the field in bags and the seed pieces are emptied from the bags into wooden crates for treating. The crates are handled by a tractor-mounted front-end loader. Two men handled the seed treating for a 4-row planter. This system was efficient in respect to time required to fill the planter hoppers but the refilling could not be accomplished quite as rapidly as was the case in the system shown in Figure 5. The contents of two crates was required to fill the four hoppers.

When the chemical used for treating the seed either in the field or at the warehouse is corrosive, this factor should be considered in the design of the seed handling equipment and the selection of materials of construction. It is also necessary to provide protection for the workers who come into contact with the treating solution. It is not within the scope of this study to evaluate the merits of the different chemicals used for potato seed treating, but the characteristics of the substance to be used should be considered in selecting equipment for this purpose. Studies on the effectiveness of different chemicals used for seed treating have been reported elsewhere.[3 4/]

[3/] Hoyman, W. G., Potato Seed Treatments in 1956. N. Dak. Agr. Expt. Sta. Bimonthly Bulletin, Vol. XIX, No. 4. 1957.

[4/] Oswald, J. W., Seed Treatment and Sanitation Practices. Kern County (California) Potato Growers Association Yearbook. 1958.

Figure 4a.

Figure 4b.

Chemical treatment of cut potato seed in the field.

Figure 5a.

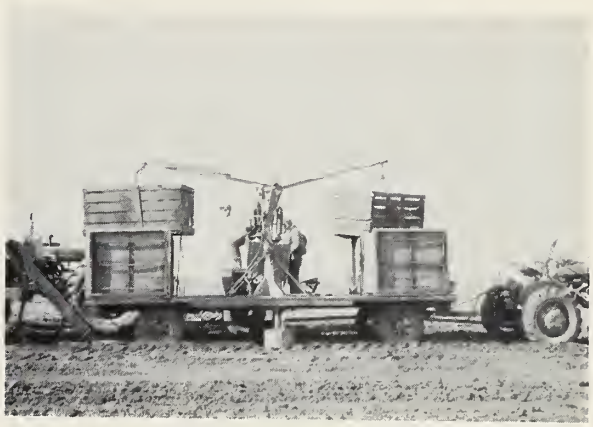


Figure 5b.

Figure 5c.

Mechanical seed handling and treating in the field.

Figure 6a.

Figure 6b.

Mechanical potato seed handling and treating in the field.

Figure 7a. Mechanical seed cutting using automatic sizer-cutter and hand-fed mechanical seed cutter for oversizing.

Figure 7b. Bagging seed potatoes from treating tank.

Figure 7c. Truck loading of seed potatoes with the bag elevator.

SUMMARY

Seed Cutting

1. A number of commercial seed cutters are available which will cut tubers into 2, 3, or 4 pieces. These include both hand-feed and automatic-feed machines. A hand-fed machine now available will make up to 6 pieces per tuber. A number of simple machines, generally known as "B" splitters, for cutting small tubers into two pieces only are in use.

2. Automatic sizer-cutters that will selectively cut tubers into 2, 3, or 4 pieces are used by some growers for cutting unsized seed stock. The oversize tubers rejected by the machine may then be cut by hand into 4, 6, or 8 pieces, sometimes more. Other operators using hand-feed machines split the oversize tubers with a hand knife and each half is placed in appropriate cups to be cut into 3 or 4 pieces.

   The rate at which the oversize tubers can be cut limits the productivity of the automatic sizer-cutters. In some instances as many as 4 workers are employed in cutting the oversize tubers rejected by the sizer-cutter. The total output of cut seed could be equaled by 7 or 8 hand cutters. (Usually 7 or 8 hand workers are required to cut seed fast enough to keep one 2-row planter going.)

3. The seed pieces produced by mechanical cutters were compared with those cut by hand in respect to degree of uniformity of size and incidence of seed pieces without eyes. It was found that the mechanically cut seed was approximately equal to hand-cut seed in both respects. To avoid excessive labor costs the hand cutters should give slight attention to the location of eyes.

4. A laboratory study was made to measure the relationship of the number of pieces into which a tuber is cut and the incidence of pieces without eyes. Red Pontiac potatoes were used for this study. Tubers were selected by weight to be cut into 2, 3, 4, 6, or 8 pieces so as to produce seed pieces averaging about 1-1/2 ounces in weight. Practically 100 percent of the seed pieces from tubers cut into 2, 3, or 4 pieces had one or more good eyes. Tubers cut into 6 pieces resulted in seed pieces of which 5 percent were devoid of eyes. Tubers were cut into 8 pieces with the result that 25 percent of the seed pieces were without eyes. The cutting of the tubers into 4 pieces or less was accomplished with a hand-feed mechanical seed cutter. The tubers cut into 6 and 8 pieces were first split by hand and each half was placed in appropriate cups of the mechanical cutter to produce the desired number of seed pieces.

Seed Handling and Treating

The seed cutting operations observed were conducted in a warehouse or seed potato storage building. The use of bags for transporting cut seed to the field is an established practice, but since the development of of mechanical harvesting into bulk truck boxes some growers use the same bulk truck boxes for transporting the seed pieces to the field. Bulk handling of cut seed eliminates the labor required at the warehouse for filling the bags and loading them onto a flat bed truck. This is especially desirable if the seed is treated at the warehouse with a corrosive solution as the bags become saturated with the solution.

Bulk handling operations observed did not decrease the number of personnel required in the field for handling seed and filling planter hoppers. However, arduous labor of handling seed filled bags is eliminated.

Some growers treat the cut seed in the field. One advantage of this procedure is the elimination of the possibility that planting operations will be interrupted with a truck load of treated cut seed on hand as might be the case where the seed is treated in the warehouse. Another advantage of field seed treating is the rapid filling of planter seed hoppers which can be accomplished when the seed is placed in a crate for immersion in the treating solution.

Presizing Recommended

Presizing of seed poaatoes can make a positive contribution to the efficiency of seed cutting operations and improve the quality of the resulting cut seed. The individual grower would need only one type of seed cutter and would need no labor to hand cut the oversize tubers. The growers relying on hand cutting of seed potatoes could use the tubers in the size range of 8 to 11 ounces just as efficiently as unsized seed stock. All tubers in excess of a size suitable for cutting into a maximum of 6 pieces should not be used for seed because of the excessive proportion of pieces without eyes when cut into 8 or more pieces.

The separation of seed stock into only 2 size ranges--less than 8 ounces and 8 to 11 ounces--could make a marked contribution to the efficiency of seed cutting operations using the mechanical equipment that is currently available. For the maximum flexibility in respect to selectivity by buyers of seed potatoes the following segregation into sizes is suggested:

Size Range	Method of Cutting or Use
Less than 2 oz.	Plant whole tubers.
2 to 3.4 oz.	Cut with "B" splitter.

3.4 to 8 oz.	Cut with mechanical cutter into 2, 3, or 4 pieces.
8 to 11 oz.	Cut by hand entirely or with aid of hand-feed mechanical cutter.

Some presizing of seed potatoes is done at the present time. If a widespread demand for presized seed should develop, it would be logical for seed producers to put increased emphasis on practices for minimizing the production of oversize tubers.

In order to make the most profitable disposition of oversize tubers, they should be segregated from the seed stock when placed in storage. The oversize potatoes could be disposed of as table stock or otherwise at any appropriate time. The seed stock could be handled independently and subdivided into appropriate size classes as needed to meet marketing schedules.

French, George W 1908–

Mechanical seed cutting and handling of potatoes. [Washington] Agricultural Research Service, U. S. Dept. of Agriculture, 1959.

ii, 17 p. illus. 27 cm. ([U. S. Agricultural Research Service] ARS 42-21)

1. Seed potatoes. [1. Potatoes—Seed] 2. Cutting machines. I. Title. (Series)

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